HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Ringold Springs Fall Chinook
Species or Hatchery Stock	Fall Chinook - Columbia River Upriver Bright (URB) *Oncorhynchus tshawytscha*
Agency/Operator	WDFW
Watershed and Region	Mid-Columbia River, Columbia River
Date Submitted	-
Date Last Updated	January 18, 2005

Section 1: General Program Description

1.1 Name of hatchery or program.

Ringold (URB) Fall Chinook Program

1.2 Species and population (or stock) under propagation, and ESA status.

Fall Chinook Columbia River - *(Oncorhynchus tshawytscha)*

ESA Status: Not listed and not a candidate for listing.

1.3 Responsible organization and individuals.

Name (and title):	Mike Lewis
	Complex Manager
Agency or Tribe:	Washington Department of Fish & Wildlife
Address:	1871 Ringold River Road, Mesa, WA 99343-9601
Telephone:	(509) 269-4448
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
Oregon Department of Fish & Wildlife	Program Participant- Broodstock, Egg incubation, and early fry rearing
National Marine Fisheries Service	Mitchell Act Program Administrator
U.S. Army Corps of Engineers	John Day Mitigation Funds Administrator
Confederated Tribes of the Umatilla Indian Reservation (CTUIR)	Program Participant- Recipient of Live Adults for S.F. Walla Walla and 3 Mile Dam Fall Chinook Programs.

1.4 Funding source, staffing level, and annual hatchery program operational costs.

Funding Sources
Mitchell Act
U.S. Army Corps of Engineers (John Day Mitigation Funds)

Operational Information	Number
Full time equivalent staff	3
Annual operating cost (dollars)	$72,000

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Bonneville Hatchery, Lower Columbia, 146.1 RM
Broodstock collection location (stream, RKm, subbasin)	Tanner Creek, 0.25 RM, Lower Columbia
Adult holding location (stream, RKm, subbasin)	Tanner Creek, 0.25 RM, Lower Columbia
Spawning location (stream, RKm, subbasin)	Tanner Creek, 0.25 RM, Lower Columbia
Incubation location (facility name, stream, RKm, subbasin)	Bonneville Hatchery, Tanner Creek, 0.25 RM, Lower Columbia
Rearing location (facility name, stream, RKm, subbasin)	Ponding and rearing to fingerling stage occurs at Bonneville Hatchery, Tanner Creek, 0.25 RM, Lower Columbia Final rearing, acclimation and imprinting for release takes place at the Ringold Hatchery located on the mainstem Columbia River, WA - 348.3 miles from the mouth of the Columbia River. The hatchery is about 17 miles west of Mesa, WA.

1.6 Type of program.

Isolated Harvest*

1.7 Purpose (Goal) of program.

Mitigation – Ringold Sps hatchery was initially built as part of the Columbia River Fisheries Development Program. The primary goal of URB chinook production released from Ringold Springs is to replace losses of wild URB chinook contributions to Treaty Indian, and non-Indian sport and commercial fisheries due to federal hydropower and habitat degradation in the Columbia River Basin.

*Re-Introduction – The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) utilize adults returning to Ringold Springs as part of re-introduction plans in the Umatilla River basin

1.8 Justification for the program..

As part of the Columbia River Fisheries Development Program, Ringold Springs Hatchery (RSH) has been used to rear chinook salmon and summer steelhead. In 1997, a cooperative agreement between the U.S. Army Corps of Engineers (COE), the Washington State Department of Fish and Wildlife (WDFW), the National Marine Fisheries Service (NMFS, NOAA Fisheries), and the Bureau of Reclamation (BOR) was reached to share the facilities at Ringold Springs Hatchery (RSH) for the benefit of the upriver bright fall chinook salmon (John Day mitigation) at Bonneville Hatchery (ODFW).

Initially the preferred broodstock for the program was Hanford Reach fall chinook but was switched to Bonneville Hatchery URB fall chinook stock. This broodstock was selected because it had characteristics, primarily late maturation, resulting in a condition more desirable for Columbia River fisheries than Lower Columbia River tule stocks. Columbia River, Upriver Bright (URB) stock are defined as wild and hatchery fall chinook originating upstream of McNary Dam (All-Species Review 1996). The URBs are major contributors to Pacific Fishery

Management Council (PFMC) and Pacific Salmon Commission (PSC) fisheries, and are an escapement indicator stock/ model stock for the Chinook Technical Committee (CTC) of the PSC. Despite the high degree of mortality that occurs during both upstream and downstream migration through the hydropower system, URBs did not experience the dramatically declining runs as have other Columbia River stocks in past years and have increased significantly along with other Columbia River stocks in past years (Columbia River Compact Joint Staff Report Fall Fact Sheets 2000-2004).

The program will be operated to provide fish for harvest while minimizing adverse affects on listed fish. Harvest of hatchery chinook in ocean, freshwater, and tribal fisheries reduces the number of hatchery-produced chinook that may escape to potentially spawn in lower and mid Columbia tributaries. This area is upstream of the listed Middle Columbia River steelhead and downstream of listed Upper Columbia spring Chinook and steelhead spawning, rearing habitat and migration. In order to minimize harvest affects in the Ringold Springs area on listed fish, WDFW submits a Fisheries Management and Evaluation Plan (FMEP) to regulate recreational fisheries in the Mid-Columbia River (MCR) Washington State Salmon Recovery Region. A final draft (March 7, 2003) has been submitted to NOAA for approval and is still in process. The objectives of the WDFW Fishery Management Evaluation Plan (FMEP) are based on the WDFW Wild Salmonid Policy (WDFW 1997). This policy states that harvest rates will be managed so that 1) spawners are abundant enough to utilize all available habitats, 2) numbers and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production, above levels needed to utilize all available habitats and provide for local adaptation, genetic diversity, and ecosystem processes, will be managed to support fishing opportunities (WDFW 1997). In addition, fisheries will be designed to ensure adult size, run timing, distribution of migrating and spawning populations, and age at maturity remains the same between fished and unfished populations. By complying with this policy, fishery impacts to listed chinook and steelhead in the MCMA will be managed to promote the recovery of these species, and at rates that will not jeopardize their survival or recovery.

In order to minimize impact on listed fish by WDFW facilities operation and the Ringold URB Fall Chinook program, the following Risk Aversion are included in this HGMP:

Table 1. Summary of risk aversion measures for the Ringold Springs Chinook program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water rights are formalized thru trust water right S3-283301 and S3-27816 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.2	The river intake is screened at 1mm openings. The Ringold Springs water supply do not have listed fish in the system.
Effluent Discharge	4.2	This facility operates and complies with limits under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-7009 and IHOT 1995 which act to protect the quality of receiving waters adjacent to the hatchery.
Broodstock Collection &	7.9	Listed fish are not collected for this program. There are no adult passage issues with this program.

Adult Passage		
Disease Transmission	7.9, see also 10.11	Fish Health Policy in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (Genetic Policy Chapter 5, IHOT 1995).
Competition & Predation	See also 2.2.3, 10.11	Current risk aversions and future considerations are being reviewed and evaluated for further minimizing impacts to listed fish.

1.9 List of program "Performance Standards".

See section 1.10

1.10 List of program "Performance Indicators", designated by "benefits" and "risks".

1.10.1 Benefits:

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Assure that hatchery operations support Columbia River fish Mgt. Plan *(US v Oregon)*, production and harvest objectives	Contribute to a meaningful harvest for sport, tribal and commercial fisheries. Achieve a 10-year average of 0.245 % smolt-to-adult survival that does not include escapement.	Survival and contribution to fisheries will be estimated for each brood year released. Work with co-managers to manage adult fish returning in excess of broodstock need.
Maintain outreach to enhance public understanding, participation and support of Washington Department of Fish & Wildlife (WDFW) hatchery programs	Provide information about agency programs to internal and external audiences. For example, local schools and special interest groups tour the facility to better understand hatchery operations. Off station efforts may include festivals, classroom participation, stream adoptions and fairs.	Evaluate use and/or exposure of program materials and exhibits as they help support goals of the information and education program. Record on-station organized education and outreach events.
Program contributes to fulfilling tribal trust responsibility mandates and treaty rights	Follow pertinent laws, agreements, policies and executive and judicial orders on consultation and coordination with Native American tribal governments	Participate in annual coordination meetings between the co-managers to identify and report on issues of interest, coordinate management, and review programs (FBD process).
Implement measures for broodstock management to maintain integrity and genetic diversity. Maintain effective population size.	A minimum of 2000 adults are collected (at Bonneville Hatchery) throughout the spawning run in proportion to timing, age and sex composition of return	Annual run timing, age and sex composition and return timing data are collected. Adhere to WDFW spawning guidelines. (WDFW 1983)
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	Use mass-mark (adipose-fin clip) for selective fisheries with additional groups Ad+CWT and CWT only for evaluation purposes	Returning fish are sampled throughout their return for length, sex, mark, and coded-wire-tags.
Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens. Follow Co-managers Fish Health Disease Policy (1998).	Necropsies of fish to assess health, nutritional status, and culture conditions	WDFW Fish Health Section inspect adult broodstock yearly for pathogens and parasites and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites	1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy

	Inspection of adult broodstock for pathogens and parasites	At spawning, lots of 60 adult broodstock are examined for pathogens
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy.

1.10.1 Risks:

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Minimize impacts and/or interactions to ESA listed fish	Hatchery operations comply with all state and federal regulations. Hatchery juveniles are raised to smolt-size (60 fish/lb) and released from the hatchery at a time that fosters rapid migration downstream. Mass mark production fish to identify them from naturally produced fish (except CWT only groups)	As identified in the HGMP: Monitor size, number, date of release and mass mark quality. Additional WDFW projects: straying, instream evaluations of juvenile and adult behaviors, NOR/HOR ratio on the spawning grounds, fish health documented.
Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including HOPPS, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed
Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring	NPDES permit compliance WDFW water right permit compliance	Flow and discharge reported in monthly NPDES reports.
Water withdrawals and instream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Hatchery intake structures meet state and federal guidelines where located in fish bearing streams.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
Hatchery operations comply with ESA responsibilities	WDFW will complete an HGMP and is issued a federal and state permit when applicable.	Identified in HGMP and Biological Opinion for hatchery operations.
Harvest of hatchery-produced fish minimizes impact to wild populations	Harvest is regulated to meet appropriate biological assessment criteria. Mass mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries.	Harvests are monitored by agencies and tribes to provide up to date information.

1.11.1 Proposed annual broodstock collection level (maximum number of adult fish).

Broodstock are collected at Bonneville Hatchery. The Ringold Springs portion is part of a green egg take goal at Bonneville of 8,900,000 requiring approximately 2,350 female and 2,350 male fall Chinook spawned in an equal female to male ratio of 1:1.

Adults returning to the Spring Creek weir and trap at Ringold Springs Hatchery have been captured and transferred as live adults to CTUIR facilities at the S.F. Walla Walla River and/or Three Mile Dam to meet their program objectives for the Walla Walla and Umatilla Subbasin programs.

1.11.2 Proposed annual fish release levels (maximum number) by life stage and location.

Fish are transferred from Bonneville Hatchery and acclimated for 30- 45 days prior to release from Ringold Springs. 3,500,000 fingerlings at 60 ffp are released into Spring Creek which joins the Columbia River at RKm. 567.

1.12 Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

The purpose of this hatchery program is to provide chinook salmon for harvest and to support production upstream of Bonneville Dam. Escapement to Ringold Springs hatchery (RSH) is not

a broodstock goal, but adult URB Chinook do return voluntarily to the Spring Creek trap. The total hatchery volunteer returns and available smolt-to-adult survival rates of this stock are provided in Table 1. Adult production through 1999 is provided in table 2.

Table 1. Volunteer only adult URB returns to RSH.

Year	On-Site Disposal*		CTUIR Transfers
	Adults	Jacks	Adults
1997	1538	31	615
1998	335	51	200
1999	2458	108	810
2000*	15	0	0
2001	2711	52	950
2002	1401	Na	849
2003	1022	Na	737
2004	827	Na	612

Table 2. Available smolt to adult survival rates for Ringold Springs Hatchery (RSH).

BRD Year	Adult Catch	Smolt to Adult %
1995	2,372	.13
1996	5,249	.26
1997	2,109	.11
1998	10,013	.48
1999	2,749^	.17^

Data from PSMFC RMIS web-site. ^ Partial numbers only.

1.13 Date program started (years in operation), or is expected to start.

The first year of releases was 1997.

1.14 Expected duration of program.

The program is on-going with no planned termination.

1.15 Watersheds targeted by program.

Lower Columbia River mainstem, mid Columbia River mainstem, and Umatilla/Walla Walla.

1.16 Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1 Brief Overview of Key Issues:

Facility upgrades should be incorporated to improve rearing conditions. Operational and facility difficulties include: the river pump used to supplement inflow to the 9 acre pond is frequently unusable as either the intake is completely out of the river or the pump must be removed for fear of flooding, avian predation can be extremely high in the 9-acre pond as no bird predation covers are installed, and may not be feasible given the expanse of the pond, and the outlet of this pond is outdated and unsafe. The pond bottom is earthen and should be rebuilt with a sloped concrete bottom to preventing outmigrating smolts from becoming trapped in isolated pools of water. All water supplies are located near public roads, with no security, making them vulnerable to vandalism and contamination. This has been a problem in the past, causing flooding to the County road and various rearing areas, fish kills, etc. The adult trap is inadequate, and planned modifications never implemented must be finished to make the trap fish and culturist friendly.

1.16.2 Potential Alternatives:

Additional rearing has been proposed in the past year. Alternatives include: move program elsewhere, possibly Priest Rapids, if funding can be secured and facility is upgraded to handle additional rearing requirements, upgrading the facility to meet current and future rearing needs and rear and release Priest Rapids stock rather than Bonneville URB.

1.16.3 Potential Reforms and Investments:

Facility upgrades should be incorporated to improve rearing conditions. Accessing more of the available surface water, rebuilding the 9-acre rearing pond, improving or in some cases repairing faulty plumbing, implementation of trap improvements, modification of the river pump for more consistent operation, installation of security fencing and permanent bird predation covers, etc. are all necessary to insure quality fish culture standards are met. These long overdue repairs and improvements would be significant in cost, but an actual dollar amount is not available. The Army Corp of Engineers (ACOE) has toured the facility as a potential site for investment, allowing for John Day mitigation.

Section 2: Program Effects on ESA-Listed Salmonid Populations

2.1 List all ESA permits or authorizations in hand for the hatchery program.

URB Fall Chinook from Bonneville are not listed. WDFW has an application for the renewal of (30 August 2004) for any incidental take of listed UCR spring Chinook and USR listed summer steelhead during the Ringold Springs area fisheries created by the hatchery program.

2.2.1 Descriptions, status and projected take actions and levels for ESA-listed natural populations in the target area.

Identify the ESA-listed population(s) that will be directly affected by the program.

None

Identify the ESA-listed population(s) that may be incidentally affected by the program.

Middle Columbia River Steelhead- *Oncorhynchus mykiss,* Listed as threatened- 3/25/1999
Upper Columbia River Steelhead- *Oncorhynchus mykiss,* Listed as Endangered- 8/18/1997
Upper Columbia River Spring-Run Chinook Salmon- *Oncorhynchus tshawytscha,* Listed as Endangered- 3/24/1999

2.2.2 Status of ESA-listed salmonid population(s) affected by the program.

Upper Columbia River Steelhead- *Oncorhynchus mykiss*
The UCR steelhead ESU includes all natural-origin populations of steelhead in the Columbia River basin upstream from the Yakima River, Washington, to the U.S./Canada border. Affects on UCR steelhead would be only while fish are in the mainstem corridor (Columbia River) from the Hanford Reach downstream. The average return (2000- 2003) counted through the Priest Rapids Dam fish ladder was approximately 18,620 fish with 3,049 wild fish. In contrast to the 1997-2001 return counted through the Priest Rapids Dam of approximately 12,900 fish. Since 2000, ocean conditions drastically improved resulting in 126% increase of Upper Columbia Steelhead returns from 2000 – 2002 (NOAA Fisheries). By October 2004, over 18,000 steelhead have passed Priest Rapids Dam. The natural component of the annual steelhead run over Priest Rapids Dam increased from an average of 1,040 (1992-1996), representing about 15 percent of the total adult count, to 2,200 (1997-2001), representing about 17 percent of the adult count during this period of time (BRT 2003). In terms of natural production, recent population abundances for both the Wenatchee and Entiat river aggregate population and the Methow population remain well below the interim recovery levels developed for these populations (BRT 2003).

Steelhead production in the Hanford Reach is poorly documented and much of what is conjectured is based on anecdotal or circumstantial evidence. Direct observation and enumeration of steelhead spawning is difficult due to river conditions in spring. In 1968 and 1970, researchers observed 150 redds during limited surveys (T. Eldred, WDW, pers. comm.). Watson (1973) refers to unspecified amounts of steelhead spawning observed in aerial surveys during the same period. Anglers have reported catching gravid steelhead in the Hanford Reach (T. Eldred, WDW, pers. comm.).

Middle Columbia River Steelhead- *Oncorhynchus mykiss*
The MCR steelhead ESU includes all natural-origin populations in the Columbia River basin above the Wind River, Washington, and the Hood River, Oregon, including the Yakima River, Washington. The MCR includes the only populations of winter inland steelhead in the United States (in the Klickitat River, Washington, and Fifteenmile Creek, Oregon). Both the Deschutes

River and Umatilla River hatchery stocks are included in the ESU, but are not listed. Critical habitat was designated for MCR steelhead on February 16, 2000 (65 FR 7764). The NMFS, in listing this ESU as threatened, cited low returns to the Yakima River, poor abundance estimates for Klickitat River and Fifteenmile Creek winter steelhead, and an overall decline for naturally-producing stocks within the ESU. Ringold Springs Hatchery is located in the UCR ESU which begins upstream of the Yakima River confluence and plants from this facility emigrate downstream through the ESU. Since 2000 though, ocean conditions improved resulting in 44% increase of Middle Columbia Steelhead returns from 2000 – 2002 (NOAA Fisheries).

Upper Columbia River Spring-Run Chinook Salmon- *Oncorhynchus tshawytscha*
The UCR spring-run chinook salmon ESU includes all natural-origin, stream-type chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat, and Methow River basins. The spring-run components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason Creek. Critical habitat was designated for UCR spring-run chinook salmon on December 28, 1993 (58 FR 68543). Ringold Springs Hatchery plants occur in the mainstem Columbia downstream of those major tributaries.

Three independent populations of spring-run chinook salmon are identified for the ESU including those that spawn in the Wenatchee, Entiat, and Methow basins (Ford et al. 1999). NMFS recently proposed interim recovery abundance levels and cautionary levels (i.e., interim levels still under review and subject to change). Ford et al. (1999) characterize cautionary levels as abundance levels that the population fell below only about 10% of the time during a historical period when it was considered to be relatively healthy. Escapements for UCR spring-run chinook salmon have been substantially below the cautionary levels in recent years, especially during 1995, indicating increasing risk to and uncertainty about the population's future status. On the other hand, returns for 1999 and 2000, the primary return year for the 1995 and 1996 broods, indicate that although they were low, returns were generally higher than the contributing broodyears. Very strong 1999 and 2000 jack returns suggest that survival rates for the 1996 and 1997 brood were high, as well. Since 2000, ocean conditions drastically improved resulting in 91% increase of Upper Columbia Spring Chinook returns from 2000 – 2002 with strong returns observed in 2003 and 2004 (NOAA Fisheries).

2.2.3 Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.

Describe hatchery activities: The following activities are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (March 29, 1999). Incidental take are submitted at the end of this HGMP.

Broodstock Collection: Broodstock are not taken at RSH. Fall Chinook adults needed for Walla Walla and Umatilla Basin re-introduction programs are collected via volitional return to the Ringold Springs fish trap. Ringold Springs traps fall chinook and up to 2003, spring chinook that volitionally entered the trap in Spring Creek. Along with these stocks, listed UCR spring chinook and UCR steelhead may also enter the trapping facility at Ringold Springs. Listed UCR spring chinook can be identified by presence of an adipose fin and are returned back to stream as only adipose fin clipped adults are used for re-introduction transfers. All steelhead, including listed UCR steelhead or hatchery steelhead with right ventral clip are released back to stream. Listed steelhead are transferred approximately 4 river miles upriver for release back to the Columbia River while hatchery fish are recycled to downstream locations. Take tables are at the back of this HGMP.

Genetic introgression: Returning fall Chinook may contribute to spawning in the Hanford

Reach but stocks are not listed. Contribution of Priest Rapids Hatchery fish spawning in Hanford Reach averaged 29.83 percent between 1979 and 2000 and the proportion of Priest Rapids Hatchery production (5.0 million) averaged 8.63 percent (Hatchery Contribution to a Natural Population of Chinook in the Hanford Reach of the Columbia River, #02-Publication Date August 2002 CRITFC). Impact on listed spring Chinook and steelhead stocks located upriver in the UCR major tributaries above and below Rocky Reach Dam (RM 397.1) is unlikely due to stock and habitat characteristics (Population Structure, Status and Life Histories of Upper Columbia Steelhead, Spring and Summer/fall Chinook, Sockeye, Coho Salmon, Bull Trout, Westslope Cutthroat Trout, Non-migratory Rainbow Trout, Pacific Lamprey, and Sturgeon February, 2003 Chuck Peven PEVEN CONSULTING, INC. 3617 Burchvale Rd. Wenatchee, WA 98801).

Operation of Hatchery Facilities: Fish are acclimated and reared in the nine acre pond. Water can be pumped from the Columbia River for imprinting to the site. The river pump intake screen located in the main river meets screen complaints requirements from NOAA. Additionally, the existing spring water supply for the facility does not contain listed fish. Effluent is rapidly diluted with the main stem Columbia River flows in this area. All flow and operations are maintained within permitted discharge guidelines. Ringold Springs adheres to The Clean Water Act Section 402 NPDES Permit requirements specific for each facility. This permit sets forth allowable discharge levels and hatchery practices necessary to protect the environment. (See HGMP Sections 4.1 and 4.2). Indirect take from this operation is unknown.

Disease: To address concerns of potential disease transmission from hatchery to natural fish, the Pacific Northwest Fish Health Protection Committee (PNFHPC) has established guidelines to ensure hatchery fish are released in good condition, thus minimizing impacts on natural fish (PNFHPC). Over the years, rearing densities, disease prevention and fish health monitoring have greatly improved the health of the programs at Wells, Klickitat and Ringold Springs Hatcheries. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995) chapter 5 have been instrumental in reducing disease outbreaks. Indirect take from disease is unknown.

Hatchery Production/Density-Dependent Effects: Up to 3.50 million URB fall Chinook are released annually. Other programs, comparable in size and larger (numbers and pounds) operate in the Columbia River system (e.g. Spring Creek NFH releases over 7 million smolts in the Columbia system). Listed steelhead and spring Chinook spawning and rearing habitat occurs in major and minor tributaries in the Upper Columbia Region (UCR) upriver of the release site. Fish produced in these areas would migrate past the hatchery location from spring to late summer. In the area below Bonneville Dam, LCR listed smolts will be co-mingled and would be migrating over the same timeline along with up river stocks. Migration rates in the Columbia mainstem are believed to be rapid (Bumgarner et al, 2000) with most smolts moving through the system quickly. Impacts on listed fish is unknown (See also *Competition* below).

Competition: Studies conducted in other areas indicate this program is likely to pose a minimal risk of competition due to the migration speed that smolted fish can travel, especially once in the Columbia mainstem. PIT tagging studies (Bumgarner et al, 2000) have indicated that URB releases from Ringold Springs moved past McNary Dam within the first two weeks (mean travel days - 14) after volitional release, with some of these fish reaching Bonneville Dam (320 RKm downstream) in two weeks. In the Columbia River, studies indicate that fish appear to travel quickly. Median Travel Time of subyearling chinook, on the mainstem Columbia River, from McNary to Bonneville Dam was estimated to average 8.0 days (29.2 RKm/d) during the years 1997 to 2003 (Memo- Michele DeHart to Bill Tweit (WDFW), 2003). In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the

Columbia River estuary, Dawley et al (1984), found the average migration rates for sub-yearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively.

Predation (Freshwater): WDFW is unaware of any studies that have been empirically estimated the predation risks to listed species posed by the Ringold Springs releases. In the absence of site-specific empirical information, the identification of risk factors can be a useful tool for reviewing hatchery programs while monitoring and research programs are developed and implemented.

Predation Risk Factors:

Environmental Characteristics: These characteristics can influence the level of predation (see SIWG 1984 for a review) with risk greatest in small systems during periods of low flow and high clarity. During the juvenile fish migration season from late March until mid-summer, flows in the river increase during spring run-off and are augmented from increased water spilled over several dams to aid juvenile migration. Below Priest Rapids Dam, the main Columbia increases from 80,000 cfs to 104,000 cfs during April, 192,000 during May and peaks in June at 266,000 cfs (USGS real time data averages 1929 – 2002).

Dates of Releases: Releases from Ringold Hatchery for the past five years have occurred in mid-June. This is generally after listed steelhead smolts from the UCR region have past. Steelhead smolts originating above McNary Dam and representing upper Columbia and Snake river origin populations exhibit average peak passage at McNary Dam from May 7 through May 26 (1984-86 observations reported in Fish Passage Center (FPC) 1987).

Relative Body Size: Salmonid predators were thought to be able to prey on fish up to approximately 1/3 of their length (USFWS 1994), although coho salmon have been observed to consume juvenile chinook salmon of up to 46% of their total length in aquarium environments (Pearsons et al. 1998). The "33% of body length" criterion for evaluating the potential risk of predation in the natural environment has been used by NOAA Fisheries and the USFWS in a number of biological assessments and opinions (c.f., USFWS 1994; NMFS 2002). WDFW believes that a careful review of the Pearson and Fritts (1999) study supports the continued use of the "33% of body length criterion" until further data for this system can be collected.

Release Location and Release Type: Fish are released are from the large nine acre acclimation pond directly into Spring Creek a short distance from the Columbia mainstem Fish are released volitionally as the pond is slowly lowered over several days. Fish are normally acclimated for 30-45 days total at this site prior to release.

Potential Ringold Springs URB predation and competition effects on listed salmonids:
3.5 million fish at an average size of 60 fpp (88 mm fl) are released. As smolts, they are less likely to compete for food or habitat with listed stocks emigrating downriver from the Upper Columbia Region (UCR) as studies suggest rapid movement once in the mainstem (see *Competition*). Listed UCR origin steelhead smolts out-migrating downstream past Rock Island Dam average 160-180 mm fork length (Peven and Fielder 1988; 1989; 1990) and exceed the size of URB chinook from this program. Listed UCR chinook fish emerge at a size of 39 - 41 mm fl, and exceed the 33% predator-prey threshold. Releases in mid-June would place program fish within the same time window as Lower Columbia chinook (March – August, LCFRB Basin Plans 2004). However, fish in the mainstem would have a high potential to migrate rapidly through the corridor. Mid-June releases also avoid listed Lower Columbia River chum peak migration periods (99% of chum from Duncan Creek (Bonneville Chum) vacated Duncan Creek by April 22 in 2004 and by May 9 in 2003) (pers. comm. Rawding, 2004).

Residualism: To maximize smolting characteristics and minimize residualism, WDFW adheres to a combination of acclimation, volitional release strategies, size, and time guidelines. Minimal

residualism from WDFW chinook programs following these guidelines has been indicated from snorkeling studies on the Elochoman River (Fuss 2000).

- Feeding rates and regimes through out the rearing cycle are programmed to satiation feeding to minimize out of size fish.
- Based on past history, fish have reached a size and condition that indicates a smolted condition at release.
- Fish have been acclimated and imprinted to the site before release.
- Releases from these ponds are volitional with large proportions of the populations moving out initially with the remainder of the population vacating with in a couple of days.

Migration Corridor/Ocean: The Columbia River hatchery production ceiling, called for in the Proposed Recovery Plan for Snake River Salmon, of approximately 197.4 million fish (1994 release levels), has been incorporated by NOAA-Fisheries into their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish. It is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor. Once reaching the Columbia River, fish appear to travel quickly. (See also *Competition*).

Monitoring:

Associated monitoring and evaluation and research programs:
Monitoring of the recreational fisheries in the vicinity of the Ringold Hatchery currently occur. CTUIR staff assists in the collection and monitoring of adult chinook returns. The performance (total survival and catch distribution) of URBs from this program will be evaluated through CWT recoveries.

Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).
Not applicable. Listed fish are not taken. Listed UCR steelhead, when identified in the trap, are transported approximately four miles upstream of the Ringold Springs area and released.

Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.
Not applicable.

Section 3: Relationship of Program to Other Management Objectives

3.1 Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the *NPPC Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

For ESU-wide hatchery plans, the production of URB Fall Chinook from Ringold Springs Hatchery is consistent with:

- 1998 Biological Assessment and Management Plan; Mid-Columbia River Hatchery Program April 1998.
- 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin
- 1999 Review of Artificial Production of Anadromous and Resident Fish in the Columbia River Basin
- Lower Columbia Salmon and Steelhead Recovery and Subbasin Plan (LCFRB 2004)
- Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994)
- The *U.S. v. Oregon* Columbia River Fish Management Plan
- NWPPC Fish and Wildlife Program

In addition, hatchery programs in the Columbia system adhere to a number of state-wide guidelines, policies and permit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. Following is a list of guidelines, policies and permit requirements that govern WDFW Columbia hatchery operations. The URB fall chinook salmon program from Ringold Springs Hatchery is consistent with the following WDFW Policies*:*

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagated salmon.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

Fish Health Policy in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Fish Policy Chapter 5, IHOT 1995).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

3.2 List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

The program described in this HGMP is consistent with the following agreements and plans:

- 1997 Cooperative agreement between the U.S. Army Corps of Engineers (COE), the Washington State Department of Fish and Wildlife (WDFW), the National Marine Fisheries Service (NMFS, NOAA Fisheries), and the Bureau of Reclamation (BOR) to share the facilities at Ringold Springs Hatchery (RSH) for the benefit of the upriver bright fall chinook salmon for John Day Mitigation and Bonneville Hatchery
- ACOE – John Day Mitigation Plan
- 1997 Inter-Agency Cooperative Agreement (USACE, WDFW, NMFS, & USBR)
- The Columbia River Fish Management Plan
- The Columbia River Anadromous Fish Restoration Plan of the CTUIR (Nez Perce, Umatilla, Warm Springs, and Yakama Tribes).
- Integrated Hatchery Operations Team (IHOT) Operation Plan 1995 Volume III.
- Pacific Northwest Fish Health Protection Committee (PNFHPC)
- In-River Agreements: State, Federal, and Tribal representatives
- Northwest Power Planning Council Sub Basin Plans

3.3 Relationship to harvest objectives.

URB chinook production from Ringold and the parent Bonneville Hatchery (ODFW) program contributes significantly to ocean, Columbia River commercial and recreational fisheries, and Treaty Indian fisheries in Zone 6 of the Columbia River. Harvest of these fall chinook takes place in: the Canadian Troll fishery, the Canadian sport and net fisheries, the Washington/Oregon coastal sport and troll fisheries, Alaskan sport and troll fisheries, Columbia River net and freshwater sport fisheries. Harvest rates have not been estimated for Ringold Springs URB but as the program originates from Bonneville Hatchery and are reared at Ringold Springs for only 30-45 days, it is likely that their profiles for harvest are similar to the Bonneville Hatchery program.

Coded wire tagged URB fall chinook indicate that contribution to fisheries is highest in freshwater commercial and recreational fisheries, as well as British Columbia and Alaska ocean commercial fisheries (**Table 3.3.1**). Within the Columbia River, Bonneville URB fall chinook are harvested in fall commercial and recreational Columbia River fisheries. Treaty Indian commercial fisheries normally harvest more Bonneville URB fall chinook than subsistence fisheries, although harvest has been relatively equal in recent years. On an annual basis, total non-Indian harvest is often similar to total Treaty Indian harvest.

Table 3.3.1. Harvest distribution of coded wire tagged Ringold Springs URB fall Chinook, 1992-1995 brood years.

Fishery Contributions (% of total adult return)				
	Alaska	**British Columbia**	**Washington**	**Oregon**
Commercial				
Ocean	25.10%	9.57%	.93%	0%
Freshwater	0%	0%	44.14%	
Recreational				
Ocean	3.27%	.59%	.85%	.85%
Freshwater	0%	0%	14.70%	0%

3.4 Relationship to habitat protection and recovery strategies.

The Hanford/Columbia River reach is managed at a much larger scale than the subbasin or province, and within the subbasin and province most of the fisheries management and habitat protection is guided through existing legal agreements such as:

Habitat Conservation Plan (HCP) - Operation, monitoring and evaluation of these programs is proposed through the Chelan and Douglas Counties PUD re-licensing HCP that started with the "Biological Assessment and Management Plan Mid-Columbia River Hatchery Program (1998)".

ESA – Permits allow direct, indirect take and incidental takes.

FERC – Federal Action Agencies summer spill at Ice harbor and several Columbia Federal dams.

Subbaisn and Recovery Planning includes:

Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Master Plan
Mid-Columbia River Sub-Basin Plans (Bonneville Dam to Priest Rapids Dam) - Salmon and Steelhead Production Plan (September 1, 1990)

Upper Mid-Columbia Mainstem Subbasin Planning and the Upper Columbia Salmon Recovery Board The County is a partner with Okanogan County , Chelan County , the Colville Tribes and the Yakama Nation. The mission of the *Upper Columbia Salmon Recovery Board* is to restore viable and sustainable populations of salmon, steelhead and other at-risk species through the collaborative efforts, combined resources, and wise resource management of the upper Columbia River region. The organization intends to approach salmon recovery efforts in a transparent and evolving process to restore fish populations for ecosystems and people

Recent Habitat Conservation Plans:
The various state and federal fisheries agencies, including NOAA Fisheries, United States Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), three Native American tribes, the Chelan and Douglas Public Utility Districts, and an environmental organization, American Rivers, developed Hydro Power Habitat Conservation Plans (HCPs) for anadromous salmon and steelhead. Chelan PUD developed plans for the Rocky Reach and Rock Island Hydro Projects (Chelan PUD 2002a, 2002b). Douglas PUD (2002) developed a plan for the Wells Hydro Project. The plans commit the two utilities to a 50-year program to ensure that their hydro projects have no net impact on mid-Columbia salmon and steelhead runs. This will be accomplished through a combination of fish bypass systems, spill at the hydro projects, off-site hatchery programs and evaluations, and habitat restoration work conducted in mid-Columbia tributary streams. In addition to monitoring spawning activity (Initiation of Spawning, End of Spawning, Critical Elevation), The Washington Department of Fish and Wildlife (WDFW) has worked in cooperation with the Bonneville Power Administration (BPA), Grant County Public Utility District (GCPUD), Pacific Northwest National Laboratory (PNNL), Columbia River Inter-Tribal Fish Commission (CRITFC), Alaskan Fisheries, United States Fish and Wildlife Service (USFWS), and the Yakama Indian Nation to perform monitoring and impact analysis of flow fluctuations on emerging and rearing fall chinook in the Hanford Reach during the past seven years (1998-2004). The objectives of the evaluations were to: determine start and end dates for implementation of the juvenile fall chinook salmon protection operations; determine factors affecting susceptibility of fall chinook fry to entrapment and stranding; estimate the number of juvenile fall chinook salmon stranded (mortalities) and entrapped in isolated pools (at risk) due to reductions in discharge from Priest Rapids Dam; and to evaluate the effectiveness of operational guidelines developed in the Interim Protection Plan on reducing mortality of fall chinook in the Hanford Reach.

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the Ringold fall chinook upriver bright program.

(1) *Salmonid and non-salmonid fishes or species that could negatively impact the program*: Ringold fall chinook smolts can be preyed upon through the entire migration corridor from release to the mainstem Columbia River estuary. Northern pikeminnows and introduced spiny rays along the Columbia mainstem sloughs can predate on chinook smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Based on PIT tags recovered at a large Caspian tern nesting colony on Rice Island, a dredge material disposal island in the Columbia river estuary, 6-25 million of the estimated 100 million out-migrating juvenile salmonids from the Columbia reaching the estuary were consumed by the terns in 1997 (Roby, et al. 1997). River otters (*Lutra canadensis*) are present in the lower Columbia region and may represent a substantial predation source on juvenile salmonids. Harbor seals (*Phoca vitulina*), Steller sea lions (*Eumetopias jubatus*), and California sea lions (*Zalophus californianus*) are commonly observed in the Columbia River estuary. Seals and sea lions reportedly prey on adult salmonids, although diet studies indicate that other fish species generally comprise the majority of their food. These mammals are often attracted to concentrated fishing effort and can be troublesome to both sport and commercial fishers by taking hooked or net-caught fish before they can be landed. Additionally, other hatchery fish may be a source of competition for Bonneville URB fall chinook.

(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program: Co-occurring natural salmon and steelhead populations in local tributary areas and the Columbia River mainstem corridor areas could be negatively impacted by program fish. Of primary concern are the ESA listed endangered and threatened salmonids: Snake River fall-run chinook salmon ESU (threatened); Snake River spring/summer-run chinook salmon ESU (threatened); Lower Columbia River chinook salmon ESU (threatened); Upper Columbia River spring-run chinook salmon ESU (endangered); Columbia River chum salmon ESU (threatened); Snake River sockeye salmon ESU (endangered); Upper Columbia River steelhead ESU (endangered); Snake River Basin steelhead ESU (threatened); Lower Columbia River steelhead ESU (threatened); Middle Columbia River steelhead ESU (threatened); and the Columbia River distinct population segment of bull trout (threatened). Listed fish can be impacted through a complex web of short and long term processes and over multiple time periods which makes evaluation of this net effect difficult. The potential exists for large-scale hatchery releases of fry and fingerling ocean-type chinook salmon to overwhelm the production capacity of estuaries (Lichatowich and McIntyre 1987). Estuaries may be “overgrazed” when large numbers of ocean-type juveniles enter the estuary en masse (Reimers 1973, Healey 1991).
WDFW is unaware of studies directly evaluating adverse ecological effects to listed salmon. See also Section 2.2.3 Predation and Competition.

3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Returning chinook and other salmonid species that naturally spawn in the target stream and surrounding production areas may positively impact program fish. Decaying carcasses may contribute nutrients that increase productivity of the overall system. There are no species that are known to directly positively impact the program. Multiple hatchery programs salmonids releases into the Columbia river system along with listed species (section 2), benefit the program by providing additional predation opportunity in the Columbia mainstem and estuary. Numerous non-salmonid fishes sculpins, lampreys and sucker etc. also would provide the same indirect

benefits.

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. A host of freshwater and marine species that depend on salmonids as a nutrient and food base may be positively impacted by program fish. The hatchery program may be filling an ecological niche in the freshwater and marine ecosystem. A large number of species are known to utilize juvenile and adult salmon as a nutrient and food base (Groot and Margolis 1991; and McNeil and Himsworth 1980). Wild co-occurring salmonid populations might be benefited as hatchery fish migrate through an area. The migrating hatchery fish may overwhelm predator populations, providing a protective effect to the co-occurring wild populations. Pacific salmon carcasses are also important for nutrient input back to freshwater streams (Cederholm et al. 1999). Successful or non-successfully spawner adults originating from this program may provide a source of nutrients in oligotrohic river systems and stimulate stream productivity. Carcasses from returning adult salmonids have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996).

Section 4. Water Source

4.1 Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile and natural limitations to production attributable to the water source.

Ringold Springs: Water is supplied by springs located east of the facility. Springs deliver 55- 60 cfs at a fairly constant temperature of 60 degree F to a headwater intake collection box. Water is then delivered to the concrete raceways and/or 9-acre pond via an eighteen-inch line. The facility has total water rights of 69.2 cfs. Temperatures in the rearing receptacles though, can range from 52°F - 62°F over the year. For this program, 2 concrete raceways and the 9-acre earthen pond have been used for the URB program. There are also 14; 8'x 80' vinyl raceways that use 1,920 gpm each. The water supply is protected by flow alarms at the intake(s), at the head box, and there are pond level alarms in the holding ponds. Outflow from the rearing ponds join un-used spring water overflow to create Spring Creek.

Columbia River water is pumped into the rearing pond prior to release to allow some olfactory acclimation. This is done by pumping water directly from a pipeline line located in the Columbia River adjacent to the rearing ponds. The intake structure for the pump is a 2' x 4' barrel type screen that is anchored to the river bottom by Ecology blocks and is under 4-10' of river depending on mainstem flow. Up to 30 cfs can be pumped to the 9-acre pond. The pipeline is approximately 30' from shore and extends 275' to the pump house located adjacent to the river. Ambient water temperatures from the Columbia mainstem range from 46°F to 60 degrees F° by early June and can be used for final acclimation and imprinting before water temperatures elevate in to unsafe levels in mid-summer. By late July and early August water temperatures can exceed 70°F (Historical and Real Time Water Temperature Data Columbia River).

4.2 Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Table 1. Summary of risk aversion measures for the Ringold URB fall Chinook program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water rights are formalized through trust water right S3-283301 and S3-27816 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.2	The Ringold Springs spring water supply does not have listed fish in the system. The Columbia River pump barrel screen openings are 1mm in diameter and do not impact listed fish. The system has a reverse blow back system, operated daily, to clean the structure of debris.
Effluent Discharge	4.2	This facility operates and complies with limits under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-7009 and IHOT 1995 which act to protect the quality of receiving waters adjacent to the hatchery.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

(See also Bonneville Hatchery, ODFW HGMPs). Broodstock are collected at Bonneville Hatchery by volitional return to adult capture ponds.

Ringold Springs: Adult fall chinook can also be collected at Ringold Springs for transport to the Walla Walla and Umatilla River basins (CTUIR project). Adults volitionally move through picket weir (with V notch) into Spring Creek Channel where an upstream picket weir limits further upstream movement. Adults are seined, collected, discriminated for biometric information (e.g. marks, CWT/PIT tags), loaded and transported.

5.2 Fish transportation equipment (description of pen, tank, truck, or container used).

Juveniles are brought from Bonneville Hatchery to Ringold Springs via 1,000 gallon tanker at Bonneville Hatchery or by 1,500 gallon tanker from Ringold Springs. The adults are hauled to the Walla Walla and Umatilla systems by 1,500 gallon CTUIR tanker truck.

Equip. Type	Capacity (gallons)	Supp. Oxygen (y/n)	Temp. Control (y/n)	Norm. Transit Time (minutes)	Chemical(s) Used	Dosage (ppm)
Tanker Truck- Adult Transfer (Upriver)	800	Y	N	15	nya	nya
Tanker Truck- Juvenile Transfer (Bonneville Hatchery to Ringold	1500	Y	N	240	nya	nya

5.3 Broodstock holding and spawning facilities.

(See also Bonneville Hatchery, ODFW HGMPs). Broodstock collection occurs at Bonneville Hatchery. (See Bonneville Hatchery HGMPs) A total of four concrete holding ponds are used ranging from 11,288 to 32,785 cu ft at Bonneville Hatchery.

5.4 Incubation facilities.

(See also Bonneville Hatchery, ODFW HGMPs). URB chinook at Bonneville are eyed in deep troughs and moved to vertical stack incubators for hatching. Water temperature is monitored via a thermograph that gauges water temperature of all water coming into the hatchery. The water source is from a well. Water temperatures vary between 49-51ºF. Dissolved oxygen (DO) levels are not monitored during incubation. Incubation densities are kept low so that low D.O. is not of concern. Use of well water ensures that siltation is not an issue. Each incubator tray has a low flow alarm, and there is a flow alarm on the head box.

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
Heath	1820	7280	NA	5500	5500
Deep troughs	360	12	1.9	40000	-

5.5 Rearing facilities.

At Ringold Springs Hatchery, they are acclimated in the 9-acre earthen pond for approximately 30-45 days and then released to the Columbia via Spring Creek. The concrete rearing ponds have been used in the past for segregating mark programs (CWT and PIT tag groups).

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)
2	Concrete Raceways	3713	100	10	4.0	750
1	Earthen Pond (9 acres)	2,940,300	NA	NA	8.0-10.0	10,000

5.6 Acclimation/release facilities.

Fish are acclimated and imprinted at Ringold Springs for 30-45 days on spring water and Columbia River water pumped into the pond. Fish are directly released from the 9-acre earthen pond at Ringold Springs to Spring Creek located a short distance to the Columbia River.

5.7 Describe operational difficulties or disasters that led to significant fish mortality.

Heavy bird predation at Ringold has impacted the program since lethal controls have been abandoned. In 2002, loss estimates ranged up to 33% due to avian predation, mostly by sea gulls. Numerous non-lethal methods have been incorporated by staff recently: a vendor has been contracted to provide falcon intimidation, timer propane cannons, cracker shells, mylar ribbons and owl models have all been used to help control avian predation. Once fish are released, gulls concentrate at the release site and fish are initially vulnerable as they stay on the edge of the river until dispersed. Instantaneous counts of 1,137 gulls along with an undetermined number of blue herons have been documented by staff in and around the 9-acre rearing pond at release.

5.8 Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Listed fish are not directly involved in the URB rearing program. Risk aversions for facility impacts would include:

- The facility is continuously staffed to assure the safe operations of the facility.
- If the main river pump is used, flow volume is monitored and the barrel screen is inspected as needed when extreme river flow conditions or operational problems suggest damage to the screen openings.
- Adult trapping, protocols include daily inspection and regular monitoring of trapped adults. Listed or fish with adipose fin present are returned back to stream quickly.

Section 6. Broodstock Origin and Identity

6.1 Source.

(See also Bonneville Hatchery, ODFW HGMPs). Broodstock for this program comes from adults trapped at Bonneville Hatchery. Fall chinook arrive at the hatchery between August and November with peak spawning is during the month of November. Over the last 9 years the Bonneville URB fall chinook brood stock has been composed entirely of returns to Bonneville Hatchery.

6.2.1 History.

(See also Bonneville Hatchery, ODFW HGMPs). Historically, the brood stock has been mainly composed of adult fall chinook returning to Bonneville Dam and Hatchery. This program started in 1977 with the trapping of late spawning fall chinook broodstock (November to December) at Bonneville Dam. These fall chinook were destined for spawning areas in the upper Columbia basin and were identified as "Up River Brights" (URB). Subsequent broodstock has been collected at Bonneville Hatchery, or at the Cascade Hatchery trap (located just up stream of Bonneville Dam). When the returns to these facilities did not produce enough fish to meet program goals, eggs from Priest Rapids stock have been included in the production. Since 1997, the Ringold Springs has used URB from Bonneville.

Broodstock Source	Origin	Year(s) Used	
		Begin	End
Up-River Brights (Bonneville Hatchery)	H	1997	-

6.2.2 Annual size.

Bonneville Hatchery: (See also Bonneville Hatchery, ODFW HGMPs), From 1991- 2003, female collection has ranged from a low of 1,664 (2000) to a high of 3,246 (1994). During the same period, male brood stock collection has ranged from a low of 851 (2000) to a high of 3,298 (1991).

6.2.3 Past and proposed level of natural fish in the broodstock.

(See also Bonneville Hatchery, ODFW HGMPs). Naturally spawning fish are not intentionally included in the brood stock although the URB fall chinook produced by Bonneville Hatchery are not 100% marked therefore an unknown level of integration could be occurring.

6.2.4 Genetic or ecological differences.

(See also Bonneville Hatchery, ODFW HGMPs). The Bonneville Hatchery URB fall chinook stock is a mixed, domesticated stock with an origin from the upper Columbia Basin. It is assumed to have genotypic, phenotypic and behavioral differences from the ancestral and current wild fall chinook stocks in the area of Bonneville Hatchery. If present, these differences in the Bonneville Hatchery URB fall chinook stock are assumed to be the result of domestication, artificial selection and stock transfer.

6.2.5 Reasons for choosing.

(See also Bonneville Hatchery, ODFW HGMPs). This broodstock was selected because it had characteristics, primarily late maturation resulting in a condition more desirable for Columbia River fisheries than Lower Columbia River tule stocks.

6.3 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

(See also Bonneville Hatchery, ODFW HGMPs). Naturally spawning listed fish are not intentionally included in the brood stock, although without mass marking, levels of listed chinook integrated within the program is unknown. Hatchery and natural origin fall chinook salmon at the Bonneville Hatchery trap can not be identified based on adipose fin clip marks; however, lower Columbia River naturally-spawning fall chinook in the vicinity of Bonneville Dam are tule fall chinook and can be distinguished from URBs based on skin color and run timing. Thus, collection of natural lower Columbia fall chinook during broodstock collection activities at Bonneville Hatchery is unlikely.

Section 7. Broodstock Collection

7.1 Life-history stage to be collected (adults, eggs, or juveniles).

Broodstock adults are not collected at Ringold Springs. (See also Bonneville Hatchery, ODFW HGMPs).

7.2 Collection or sampling design

(See also Bonneville Hatchery, ODFW HGMPs). Adults enter the trap voluntarily at Bonneville Hatchery and are selected randomly from the available fish for brood stock. During 1990 - 2003, the initial brood stock collection date ranged from August 26 – September 6, with the last day occurring from November 21- December 19. Correspondingly, initial spawning dates started from October 27 – November 5 with the last date ending during November 20 – December 14.

Ringold Springs Hatchery – Fish move volitionally move through picket weir (with V notch) into Spring Creek Channel where an upstream picket weir contains adults. Adults will be seined, collected, discriminated for biometric information (e.g. marks, CWT/PIT tags), and can be loaded and transported for disposal or to the out-basin sites (e.g. S.F Walla Walla CTUIR, 3 Mile Dam Facility).

7.3 Identity.

(See also Bonneville Hatchery, ODFW HGMPs). Bonneville Hatchery URB fall chinook are not 100% marked. Tule stock fall chinook can, however, be separated from URB stock fish by skin color and run time. Since fish are not mass marked at this time, an unknown level of integration could be occurring.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):

(See also Bonneville Hatchery, ODFW HGMPs). A green egg take goal of 11,500,000 requires spawning 2,610 female and 870 male fall chinook (spawned in a ratio of 3 females: 1 male).

Ringold Springs: For out of basin re-introduction transfers, a collection and transfer goal from Ringold Springs has not been established, but in the future be dependent upon escapement to the Walla Wall and Umatilla systems.

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.

(See also Bonneville Hatchery, ODFW HGMPs), From 1991- 2003, female collection has ranged from a low of 1,664 (2000) to a high of 3,246 (1994). During the same period, male brood stock collection has ranged from a low of 851 (2000) to a high of 3,298 (1991).

Ringold Springs Hatchery: For out of basin re-introduction transfers, see section 7.1.

7.5 Disposition of hatchery-origin fish collected in surplus of brood needs.

(See also Bonneville Hatchery, ODFW HGMPs). All fish are donated to food banks if in good condition or disposed of at landfill if in poor condition.

Ringold Springs Hatchery: Adults are collected, discriminated for biometric information, and disposed of at food banks or landfill. If needed for re-introduction efforts in the Umatilla Basin, CTUIR transports adults live.

Year	On-Site Disposal*		CTUIR Transfers
	Adults	Jacks	Adults
1997	1538	31	615
1998	335	51	200
1999	2458	108	810
2000*	15	0	0
2001	2711	52	950
2002	1401	Na	849
2003	1022	Na	737
2004	827	Na	612

*Trap failed during 2000.

7.6 Fish transportation and holding methods.

See sections 5.2 and 5.3.

7.7 Describe fish health maintenance and sanitation procedures applied.

(See also Bonneville Hatchery, ODFW HGMPs). Pacific Northwest Fish Health Protection committee (PNFHPC), state or tribal guidelines are followed for broodstock fish health inspection, transfer of eggs or adults and broodstock holding and disposal of carcasses. Broodstock holding facilities are monitored daily and mortalities removed as needed.

7.8 Disposition of carcasses.

Bonneville Hatchery: (See also Bonneville Hatchery, ODFW HGMPs). All fish are donated to food banks if in good condition or disposed of at landfill if spawned or in poor condition.
Ringold Springs Hatchery: If not needed for re-introduction, fish can be donated or disposed of.

7.9 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

(See also Bonneville Hatchery, ODFW HGMPs). The trap is checked daily and any listed fish present are transported upstream. Fish are hauled upstream of Bonneville Dam up to 2 times per day, depending on escapement numbers.

Ringold Springs: Not applicable.

Section 8. Mating

8.1 Selection method.

(See also Bonneville Hatchery, ODFW HGMPs). Only hatchery-origin fish are intentionally used for the broodstock. Ripe males and females available on a given day are randomly selected for mating.

8.2 Males.

(See also Bonneville Hatchery, ODFW HGMPs). Precocious males are NOT used as a set percentage or in proportion to their contribution to the adult run. Beginning in 2003, 1:1 female to male ratios will be used. Prior to 2003, ratios of 1:3 and 1:2 were used.

8.3 Fertilization.

(See also Bonneville Hatchery, ODFW HGMPs). Until the mid-1990s, both eggs and milt were pooled prior to fertilization. 1:1 female to male ratios are now used.

8.4 Cryopreserved gametes.

Cryopreserved gametes are not used.

8.5 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

(See also Bonneville Hatchery, ODFW HGMPs).

- Listed, wild fish are not intentionally taken for broodstock in this hatchery program, therefore they are not affected by mating procedures.
- However, to maintain within hatchery-population genetic diversity, adults used for brood are mixed and randomly selected throughout entire run.
- Pairs of males and females are mated randomly with conscious effort made to avoid bias due to size or other external characteristics.
- Since broodstock is collected throughout the temporal duration of the run, it is believed that this method is sufficiently random to avoid genetic bias within the hatchery program.

Section 9. Incubation and Rearing.

9.1.1 Number of eggs taken and survival rates to eye-up and/or ponding.

(Data below provided by Bonneville Hatchery, ODFW) Information with the exception of the Fingerling-smolt survival data is from Bonneville Hatchery. The take and survival numbers apply to fall chinook at Bonneville.

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)	Fry-fingerling Survival (%)	Fingerling-Smolt Survival (%)
1990	19,707,000	91.0	99.9	99.8	Na
1991	14,209,000	90.9	99.4	98.3	Na
1992	10,335,000	90.9	99.4	97.98	Na
1993	11,022,000	91.2	98.6	99.7	Na
1994	15,395,000	91.1	98.1	99.0	Na
1995	12,475,000	91.2	98.6	99.3	95.0
1996	12,842,000	90.3	98.8	99.0	95.0
1997	14,824,000	98.9	99.0	99.8	97.0
1998	8,057,000	87.5	97.4	99.4	99.0
1999	10,481,000	94.3	99.0	99.2	98.0
2000	7,554,000	95.7	99.4	99.6	85.0
2001	11,133,000	94.9	98.2	99.7	Na
2002	9,723,724	Na	93.0	Na	Na
2003	10,105,803	Na	83.0	Na	Na
2004	Na	Na	Na	Na	Na

9.1.2 Cause for, and disposition of surplus egg takes.

Bonneville Hatchery determines if there are egg deficits in other programs before disposing of eggs in a variety of ways.

9.1.3 Loading densities applied during incubation.

See Section 5.4 for details regarding loading densities during incubation.

9.1.4 Incubation conditions.

See Section 5.4 for details regarding incubation conditions.

9.1.5 Ponding.

Ponding takes place at The Bonneville Hatchery, ODFW. Ponding is forced at 1,800 CTU.

9.1.6 Fish health maintenance and monitoring.

Ringold Springs: Staff conducts daily inspection, visual monitoring and sampling of sub-yearling fish. As soon as potential problems are seen, these concerns are immediately communicated to the WDFW Fish Health Specialist. In regular monitoring, fish health specialists conduct inspections monthly. Potential problems are managed promptly to limit mortality and reduce possible disease transmission.

9.1.7 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Listed, wild fish are not intentionally taken for broodstock in this hatchery program; therefore they are not affected by incubation procedures.

9.2.1 Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1990-2001), or for years dependable data are available.

(Data below provided by Bonneville Hatchery, ODFW) Information with the exception of the Fingerling-smolt survival data is from Bonneville Hatchery. The take and survival numbers apply to all fall chinook at Bonneville.

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)	Fry-fingerling Survival (%)	Fingerling-Smolt Survival (%)
1990	19,707,000	91.0	99.9	99.8	Na
1991	14,209,000	90.9	99.4	98.3	Na
1992	10,335,000	90.9	99.4	97.98	Na
1993	11,022,000	91.2	98.6	99.7	Na
1994	15,395,000	91.1	98.1	99.0	Na
1995	12,475,000	91.2	98.6	99.3	95.0
1996	12,842,000	90.3	98.8	99.0	95.0
1997	14,824,000	98.9	99.0	99.8	97.0
1998	8,057,000	87.5	97.4	99.4	99.0
1999	10,481,000	94.3	99.0	99.2	98.0
2000	7,554,000	95.7	99.4	99.6	85.0
2001	11,133,000	94.9	98.2	99.7	Na
2002	9,723,724	Na	93.0	Na	Na
2003	10,105,803	Na	83.0	Na	Na
2004	Na	Na	Na	Na	Na

9.2.2 Density and loading criteria (goals and actual levels).

Fish at Ringold Springs are reared in a 9-acre pond. Up to 100,000 pounds of fish can be reared in this unit. Currently, springs deliver approximately 10,000 gpm to this unit with additional water from the Columbia River instream pump providing up to 30 cfs additionally if needed to stay within loading guidelines below:

Density and Loading Criteria (Nine acre pond)			
	Start	End	Maximum Level
Lbs/cu ft	.12	.24	.30 - 50
Lbs/gpm	3.5 lbs/gpm	7.0 lbs/gpm	8.0 –10.0 lbs/gpm

9.2.3 Fish rearing conditions.

Ringold Springs: Water temperature is monitored via thermometers in the holding pond. Water is supplied by springs located east of the facility. Springs deliver water at a fairly constant temperature of 60 degree F and flow to an intake box. Up to 55 cfs is gravity fed to the rearing vessels via a 4,700 linear foot polyethylene pipeline, 42 inches in diameter. For this program, 2 concrete raceways and the 9-acre earthen pond have been used. There are also 14; 8'x 80' vinyl raceways that use 1,920 gpm each. The water supply is protected by flow alarms at the intake(s), at the head box, and there are pond level alarms in the holding ponds.

Additional water can be pumped directly from a pipeline line located in the Columbia River adjacent to the rearing ponds. The intake structure is a 2' x 4' barrel type screen that is anchored to the river bottom by Ecology blocks and is under 4-10' of river depending on mainstem flow. Additional water of up to 30 cfs can be pumped from a pump house to the appropriate ponds. The pipeline is approximately 30' from shore and extends 275' to the pump house located adjacent to the river.

The 9-acre pond is gravel bottomed and is allowed to air dry after fish have been released and before the next group is brought in. Mortalities are picked daily, and the pond is inspected by pathologists monthly. IHOT standards are followed for: water quality, alarm systems, predator control measures, loading and density to provide the necessary security for the cultured stock. The program uses a diet and growth regime that mimics natural seasonal growth patterns. See Section 5.5 for specific information regarding loading densities.

9.2.4 Indicate biweekly or monthly fish growth information (average program performance), including length, weight, and condition factor data collected during rearing, if available.

After transfer from Bonneville, fish are reared for less than two months at Ringold Springs. Growth data is provided below:

Rearing Period	Length (mm)	Weight (fpp)	Condition Factor	Growth Rate
May	69.4	99	1.32	Na
June	88	60	1.18	Na

9.2.5 Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

See section 9.2.4.

9.2.6 Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Feeding rates are followed so that fish size is within 10% of program goal each year. Operator conducts periodic feed quality analysis. * Indicate maximum levels.

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
May	Moore Clark Nutra #1	6	2.5	.0875*	0.8
June	Moore Clark Nutra 1.5	5	1.75-2.0	.1400*	0.8
June	Moore Clark Fry 1.5	2	1.5-2.0	.1400*	0.7

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures.

IHOT fish health guidelines are followed to prevent disease transmission between lots of fish on site or transmission or amplification to or within the watershed. The juvenile rearing density and loading guidelines used at the facility are based on standardized agency guidelines, life-stage specific survival studies conducted on-site, life-stage specific survival studies conducted at other facilities and staff experience. During the late spring, the quantity of flow from the springs may dictate release of the fish if spring flow is low and fish health could be compromised.

9.2.8 Smolt development indices (e.g. gill ATPase activity), if applicable.

The migratory state of the release population is determined by past history including time and size of fish. Behavioral cues such as; loose scales during feeding and swarming behavior are also monitored by staff.

9.2.9 Indicate the use of "natural" rearing methods as applied in the program.

None, although the 9-acre rearing pond has some natural elements including: gravel bottom with some larval insect growth (natural feed) and predator avoidance training resulting from the presence of birds.

9.2.10 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Listed, wild fish are not taken for broodstock in this program, therefore they are not affected by rearing procedures.

Section 10. Release

10.1 Proposed fish release levels.

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Fingerling	3500000	60	June	Spring Creek (Tributary to Columbia River)	567	Upper Middle Columbia	Columbia Plateau

10.2 Specific location(s) of proposed release(s).

See section 10.1. The outlet of the 9-acre pond enters Spring Creek a short distance above the confluence with the Columbia River.

10.3 Actual numbers and sizes of fish released by age class through the program.

Release Year	Fingerling Release		
	No.	Date (MM/DD)	Avg Size (fpp)
1998	3,491,207	June 24-27	57.5
1999	3,484,000	June 16-22	45.2
2000	3,436,897	June 13-19	46.6
2001	2,974,905	June 18-24	40.8
2002	2,283,020	June 17-24	50.3
2003	3,322,946	June 6-18	58.0
2004	3,007,316	June 14-20	58.5

10.4 Actual dates of release and description of release protocols.

Fish are directly released from the 9-acre pond to an outlet that joins Spring Creek, which flows to the Columbia River. Releases occur when screens are removed. A significant portion of the population is allowed to emigrate volitionally. This volitional release can take up to two weeks with the pond slowly lowered as the population moves out. See actual date of releases in section 10.3.

10.5 Fish transportation procedures, if applicable.

Juvenile are transferred from Bonneville Hatchery to Ringold Springs Hatchery via a 1500 gallon tanker. See below.

Equipment Type	Capacity (gallons)	Supp. Oxygen (y/n)	Temp. Control (y/n)	Norm. Transit Time (minutes)
Tanker Truck- Juvenile Transfer (Bonneville Hatchery to Ringold	1,500	Y	N	240

10.6 Acclimation procedures (*methods applied and length of time*).

Rearing and release of URB chinook at Ringold is acclimated to the area by rearing fish at least a 30 days (up to 45 days) on a combination of Ringold Spring water and Columbia River mainstem water. River water is pumped from a location in the river adjacent to Ringold Springs Hatchery.

10.7 Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

The program is index marked (CWT and adipose clipped) at Bonneville Hatchery before transfer to Ringold Springs. In 2003 and 2004, 200,000 fish (5.7%) were marked and tagged (CWT) and released with the main production group. Pits tags were used in from 1997 – 2000 BRD (1998-2001 releases).

10.8 Disposition plans for fish identified at the time of release as surplus to programmed or approved levels

Ringold: Numbers of fish reared and acclimated at Ringold Hatchery facility are set forth in Annual Brood Document and according to interagency agreements. All fish reared and acclimated at the facility are considered within approved levels; thus surpluses are not experienced at this facility.

10.9 Fish health certification procedures applied pre-release.

All fish are examined for the presence of "reportable pathogens" as defined in the PNFHPC disease control guidelines, within 3 weeks prior to release. Fish transferred into the subbasin are inspected and accompanied by notifications as described in IHOT and PNFHPC guidelines.

10.10 Emergency release procedures in response to flooding or water system failure.

Ringold Springs Hatchery: Outlet screens/boards to rearing systems would be pulled, and fish would be allowed to volitionally move out of facility.

10.11 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Releasing smolts into Spring Creek, where no listed fish are present, minimizes ecological interactions with other species. To minimize interactions with any listed species in the mainstem Columbia River, smolts are released full term when they are expected to promptly outmigrate rather than interact with any listed species. See also section, 2.2.3.

Section 11. Monitoring and Evaluation of Performance Indicators

11.1.1 Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Continue to calculate annual fisheries contribution rates based on coded-wire-tag recoveries in regional commercial and sport fisheries. Continue use of mass marked (ad clip) and coded-wire-tagged groups as effective management and research tools.

11.1.2 Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

See section 1.10

11.2 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Monitoring, evaluation and research follow scientific protocols with adaptive management process if needed. WDFW will take risk aversion measures to eliminate or reduce ecological effects, injury, or mortality as a result of monitoring activities. Most trap mortalities are the result of extreme environmental conditions that flood traps or equipment failure. WDFW will take precautions to make sure the equipment is properly functioning during the season. If environmental conditions are forecast that will cause high mortality, traps will be removed or opened to allow unobstructed passage without mortality. Any take associated with monitoring activities is unknown but all follow scientific protocols and “Best Practices” designed to minimize impact.

Section 12. Research

12.1 Objective or purpose.

In 1997, studies to evaluate the feasibility of using Ringold Springs facility as a URB release site for a substantial portion of John Day Mitigation for the Bonneville Hatchery. Annual Report "Ringold Springs Hatchery Test Facility, 2000) is available. CWT juvenile evaluation ended in 2001. Results are on-going through 2005 with a Annual Report "Ringold Springs Hatchery Test Facility, 2004 available.

Besides utilizing the 9-acre pond, four additional concrete ponds were constructed and tested for use in growth and release strategies. Initial objectives are:

1) Evaluate the use of Bonneville Hatchery as egg bank for John Day Mitigation

2) Evaluate fish reared and release at RSH before and after release.

3) Evaluate down-stream migration of juveniles through Columbia hydroelectric system (PIT tag study).

12.2 Cooperating and funding agencies.

1) U.S Army Corps of Engineers- Funding per John Day Mitigation.

2) Oregon Department of Fish & Wildlife- Bonneville Hatchery broodstock, egg incubation, and juvenile rearing.

3) Washington Department of Fish & Wildlife- Ringold Spring Hatchery rearing, acclimation, and release.

12.3 Principle investigator or project supervisor and staff.

Howard Fuss- Research Scientist, WDFW Fish Program, Resource Assessment

Joe Bumgarner and Lance Ross- WDFW Fish Program, Science Division (Snake River Laboratory)

12.4 Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

1) Snake River spring/summer chinook, fall chinook, sockeye, coho, and steelhead stocks

2) Columbia River spring/summer chinook, fall chinook, sockeye, coho, and steelhead stocks

3) Columbia/Snake bull trout

12.5 Techniques: include capture methods, drugs, samples collected, tags applied.

1) Capture of hatchery juvenile fish from rearing vessels

2) Application of tags (CWT and PIT) to experimental treatment groups.

3) Passive detection of PIT tagged fish (downstream and upstream migrants) at McNary, John Day, and Bonneville projects.

4) Handling and discrimination of adult returns for adipose/CWT marks.

12.6 Dates or time periods in which research activity occurs.

1) Juvenile rearing/marking/release= May-June

2) Juvenile monitoring and discrimination at McNary, John Day, and Bonneville projects= June-October

3) Adult monitoring and discrimination at McNary, John Day, and Bonneville projects= July-November.

12.7 Care and maintenance of live fish or eggs, holding duration, transport methods.

1) Test/treatment juvenile fish (control and two treatments) are retained in duplicate raceways (3) at Ringold Springs Hatchery during May and June.

2) Test/treatment juvenile fish (control and two treatments) are volitionally released from Ringold Springs Hatchery at ~50 fpp in June.

12.8 Expected type and effects of take and potential for injury or mortality.

No take of listed fish species are expected since:

1) Test/treatment fish are handled in rearing vessels where listed species have no access.

2) Test/treatment fish are passively discriminated at McNary, John Day, and Bonneville Hatchery.

3) Test/treatment fish are not expected to impact listed fish significantly relative to competition for food and space since RSH fish are smolted and move through the river system quickly.

12.9 Level of take of listed fish: number of range or fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

Not applicable.

12.10 Alternative methods to achieve project objects.

Not applicable.

12.11 List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

Not applicable.

12.12 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury or mortality to listed fish as a result of the proposed research activities.

Not applicable.

Section 13. Attachments and Citations

13.1 Attachments and Citations

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Section 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

14.1 Certification Language and Signature of Responsible Party

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____